

## ABSTRACT

### METHOD AND APPARATUS FOR TIME DOMAIN EQUALIZATION IN AN XDSL MODEM

5 The current invention provides a method and apparatus for time domain equalization in an XDSL modem. A received communication channel is analyzed to determine the highest frequency component thereof. Typically, there is an inverse relationship between the length of a subscriber line and the highest frequency component over  
10 which communications can be supported. In response to the frequency determination, the sampling rate for the channel is reduced to the lowest sample rate consistent with maintaining signal integrity on the highest frequency component of the channel. The sampling rate reduction may be accomplished in the analog portion of the receive path, e.g. the analog-to-digital converter (ADC) or in a digital decimator coupled thereto.  
15 Concurrently the demodulator complexity is also scaled back. Where the XDSL protocol is digital multi-tone (DMT) the input sample size to the discrete Fourier transform (DFT) engine is reduced accordingly. With these adjustments in place TEQ resources may be scaled inversely. Thus as line length increases and the available bandwidth on the subscriber line is reduced more TEQ resources are made available to  
20 deal with the increased delay interval over which intersymbol interference is evidenced. Scaling of TEQ resources may be accomplished using a TEQ architecture which allows either the length or the tap line or the delay between taps to be varied.

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# Application for U.S. Patent

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